



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-LAW-MK-LOP-SCB-00001,
24590-LAW-MK-LOP-SCB-00002

R10206349

Project:	RPP-WTP	P&ID:	24590-LAW-M6-LOP-P0001, P0002
Project No:	24590	Process Data Sheet:	24590-LAW-MKD-LOP-00002, 00004
Project Site:	Hanford	Vessel Drawing	24590-LAW-MK-LOP-P0001001, 002, 003
Description:	MELTER 1, 2 Submerged Bed Scrubber		

Reference Data

Charge Vessels (Tag Numbers)	None
Pulsejet Mixers / Agitators (Tag Numbers)	None
RFDs/Pumps (Tag Numbers)	None

Design Data

Quality Level	QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category	SC - 3	Design Code	ASME VIII Div 1		
Service/Contents	Radioactive liquid	Code Stamp	Yes		
Design Specific Gravity	1.1	NB Registration	Yes		
Maximum Operating Volume	gal	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	Estimated	37,300	78,800	82,500
		Actual *			

Inside Diameter	inch	120	Wind Design	NIA	
Length/Height (TL-TL)	inch	78	Snow Design	NIA	
		Vessel Operating Vessel Design Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-FB01-TP001	
Internal Pressure	psig	ATM 15 125 (Note 2)	Seismic Base Moment *	ft*lb	
External Pressure	psig	3.6 FV -	Postweld Heat Treat	Not Required	
Temperature	°F	212 (Note 6) 237 (Note 7) 237 (Note 2)	Corrosion Allowance	Inch	(Note 8)
Min. Design Metal Temp.	°F	41	Hydrostatic Test Pressure *	psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ISSUED BY
RPP-WTP-PDC
INIT **HW** DATE **2-3-04**

EXPIRES 12/10/04

This Bound Document Contains a total of 4 pages.

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Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SB575 N06022	See Drawing	Auxiliary
Shell	SB575 N06022	See Drawing	Primary
Bottom Head	SB575 N06022	See Drawing	Primary
Support	SA240 304 (Notes 5)	See Drawing	NIA
Internal Coils/Half-Pipe Coils	SB622 N06022/ SA312 304(Note 5)	See Drawing	NIA
Internals	SB575 N06022 / SB622 N06022 (Note 9)	See Drawing	Thermowell Primary
Pipe	SB622/SB619 N06022 SB575 N06022 (Note 10)	See Drawing	Note 4
Forgings/ Bar stock	SB564 N06022	See Drawing	NIA
Gaskets	EPDM / Garlock Helicoflex	NIA	NIA
Bolting	SA193 Grade B16	NIA	NIA

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	NIA	Insulation Material	None
Insulation Thickness (inch)	NIA	Internal Finish	Welds descaled as laid.
		External Finish	Shell welds under half pipe coils to be ground smooth. Others descaled as laid.

Remarks

* To be determined by the vendor.

** Refer to Note 6.

*** Refer to Note 7.

Note 1 : This vessel has an internal removable bed or column. This bed has different operating characteristics than the vessel and is noted in the localized features section on sheet 2.

Note 2 : The coil operating conditions are 90 psig and 50° F.

Note 3 : The bed packing material is ceramic spheres 1" dia and weigh 115 lb/ft³.

Note 4 : Nozzle necks below the high operating liquid level are primary, the others are auxiliary.

Note 5 : SA240 304 & SA312 304 stainless steel material shall have carbon content of 0.030% maximum. Non welded items are excluded from this requirement.

Note 6 : The vessel normally operates at 140 °F, however, operating fluctuations can allow it to reach 212 °F.

Note 7 : To consider upset condition, the top head cover & top head flange shall be designed to 1250 °F & 400 °F respectively.

Note 8 : Corrosion allowance for surfaces exposed to process liquid shall be 0.04". Corrosion allowance of 0.04" shall be applied to stainless steel surfaces exposed to cooling coil fluid. If exposed surfaces to cooling coil fluid is vessel alloy material, corrosion allowance of 0.01" shall be applied.

Note 9 : Internal fasteners shall be of alloy N06022 material.

Note 10 : SB575 N06022 material allowed for 4" and 6" nozzles rolled from plate to meet wall thickness requirements. Full RT inspection mandatory

Equipment Cyclic Data Sheet

Component Plant Item Number:	
Component Description	Vessel

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SB575 N06022 (Hastelloy C -22)
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Design Life	40 years
Component Function and Life Cycle Description	<p>The SBS is a semi-passive device designed for aqueous scrubbing of entrained radioactive particulate from the melter offgas. It also serves to cool and condense the melter vapor emissions.</p> <p>Melter offgas is nominally cooled from 392 deg. F while feeding (from 752 deg. F when idled) to 122 deg. F. Operation within and between these two modes are the predominate conditions the vessel will encounter.</p> <p>Design parameters for the cooling coils is to cool the offgas from 392 deg. F to a maximum of 140 deg. F.</p> <p>Occasional process upsets will direct undiluted offgas to the SBS at temperatures near 1250 deg. F., where the SBS will cool the gasses to 140 deg. F.</p> <p>Non-routine, or heavy maintenance would include the change out of a Vitrification Melter or other heavy non-routine maintenance requiring manned entry to the wet process cell. This is expected to occur annually. During heavy maintenance, the SBS would be isolated and allowed to remain at ambient temperature or approximately 41 to 100 deg. F.</p>

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	15	8	Nominal Assumption
Operating Pressure	psig	-2.2	0	40	Bed min. -0.36, max. 0. Assume an annual shutdown (40 cycles/lifetime).
Operating Temperature	°F	104	140	Infinite	Normal operating range.
Contents Specific Gravity		1	1.1	40	Nominal operating is 1.1, assume annual flush out and replace with clean water.
Contents Level	inch	Empty	63	120	Nominal operating is 63 inch from datum, assume annual 3x flush out and replace with clean water.
Localized Features		Temperature Range (°F)		Number of Cycles / Comment	
Nozzle (N2) & Top Head Cover		41 392 752 1250		<p>Assume normal mode is feeding (392), with 40 cycles to upset (1250) and back to Idle (752).</p> <p>Assume normal mode is feeding (392) with 2100 cycles to Idle (752) and back to feeding.</p> <p>Assume mode is idle (752) with 40 cycle of trip to upset (1250), and return to idle (752).</p> <p>Assume mode is idle (752) with 40 cycle to off (41) and back to Idle (752).</p>	
Nozzle (N1)		41 70 1250		<p>Assume normal mode is feeding (70), with 40 cycles to upset (1250) and back to Idle (70). [Unplanned activations]</p> <p>Assume mode is idle (70) with 2100 cycle of trip to upset (1250), and return to idle (70). [Weekly surveillance tests]</p> <p>Assume mode is idle (70) with 40 cycle to off (41) and back to Idle (70).</p>	
Cooling Supply / Returns		41 in, 68 out		<p>Nominally, temperature is 41 in, 68 out. Assume annual cooling outage, In=out=ambient=70 (40 cycles). Assume annual cooling supply failure/isolation during operation, In=out=212 (40 cycles).</p>	
Internal Bed		41 140		Assume 40 cycles from running (140), to off (41), then resume (140).	



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Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***The seller shall consider the conditions of nozzles N1 and N2 happening coincidentally.***